AUS

ROAD ACCIDENTS IN AUSTRALIA

Jim LANGFORD
Senior Research Fellow, Accident Research Centre, Monash University, Victoria, Australia

Stuart NEWSTEAD
Senior Research Fellow, Accident Research Centre, Monash University, Victoria, Australia

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This article is the latest ten-year update in a series of articles describing crash and road safety trends in Australia. Previous articles were contributed by Maxwell Lay (1988) and Andrew Edgar (1999), both of ARRB Transport Research.

1. ROAD DEATH TRENDS IN AUSTRALIA

The annual numbers of road deaths in Australia 1950-2007 are shown in Figure 1[1].

Fatal crash trends since 1950 fall into four distinct phases. In the first phase covering the 1950s and 1960s, national fatality levels steadily increased to reach a peak of almost 4,000 deaths in 1970. The second phase covered the 1970s and saw fatality numbers remain at near-peak levels of around 3,500 throughout this decade. In the third phase which stretched from around 1980 to the mid 1990s, fatalities rapidly declined to fall below 2,000 by 1993 - with the steepest decline from 1989 to 1993, corresponding to a period of major economic recession in Australia. The final phase which includes the most recent ten years, has been characterised by a marked slowing down in safety improvements - and since 2003, a near stagnation at a level just exceeding 1,500 deaths.

However absolute measures of the road toll tell only part of the story. Table 1[1] shows the changes in the absolute numbers of road deaths and in the per population and per distance death rates over the most recent ten-year period.

Considering the most recent ten years 1998-2007, the fall in absolute death numbers averaged out at just below a one percent decline annually. In contrast, the decline in the per population death rate has averaged out at almost two percent annually, with the average annual decline in

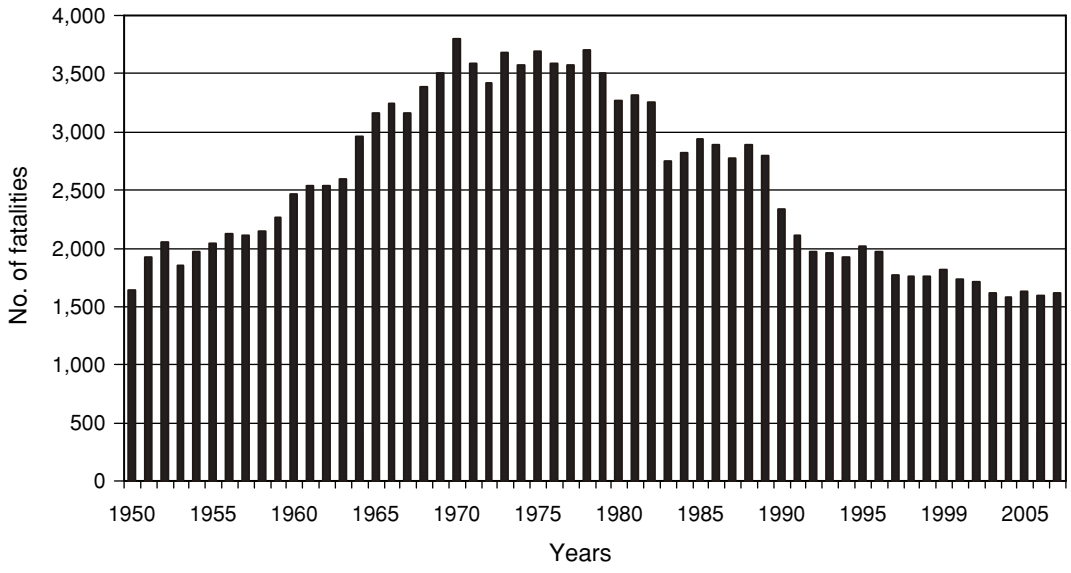

Fig. 1 Road deaths in Australia 1950-2007

Table 1 Changes in road death numbers and rates, 1998-2007

	Annual no. of deaths	Annual death rate per 100,000 population	Annual death rate per 100 million vehicle kilometres travelled
1998	1,755	9.38	1.05
2007	1,616	7.69	0.76
% decline over 10 years	7.9	18.0	27.6

Note: The 2006 annual death rate per 100 million vehicle kilometres travelled has been used for 2007, due to unavailability of 2007 travel data.

the per distance death rate at almost three percent. In other words, while the dramatic reductions in the road toll experienced during the 1980s and early 1990s have ceased, it remains that the suite of countermeasures currently being implemented in Australia continue to have a significant impact in the face of rapidly rising population and even more rapidly rising rates of travel in Australia. To quantify the benefits of improved road safety countermeasures, had road safety performance remained at 1998 levels, growth in travel would have resulted in over 2200 deaths in 2007, far more than the 1616 observed.

From an international perspective and considering the most recent period for which data are available (the eleven years 1995-2005 inclusive)[2], Australia's per population road death rates have declined in almost exact accordance with the median reduction for all OECD countries (28.6% and 28.9%, respectively). This at-par performance contrasts with the previous two decades, when Australia's rates of reduction doubled the median OECD reductions (57.9% and 28.1% respectively, for the period 1975-1995).

The slowdown in safety performance over the past decade or so is reflected in Australia's international safety rankings. In 1975 Australia's per population death rate was ranked 22nd of all OECD countries, improved to 8th by 1995 and had fallen back to 10th by 2005.

2. EXPLAINING THE REDUCTION IN ROAD DEATHS IN AUSTRALIA, 1970 TO THE MID 1990S

The decline in the absolute number of road deaths during this period may be attributed largely to the development of a more systematic approach to tackling road safety issues. The key countermeasures progressively introduced from 1970 onwards[3] are summarised in Table 2, structured within a 'Haddon's matrix'[4].

The approach represented by Haddon's matrix and successfully implemented in Australia, "helped to shift injury prevention away from an early, naïve preoccupa-

Table 2 Principal road safety countermeasures in Australia, 1970 onwards, arranged in Haddon's matrix

Phase	Host (human)	Vector (vehicle)	Physical Environment	Sociopolitical Environment
Pre-crash	1. Introduction of random breath testing in Victoria (1976) - and thereafter in other jurisdictions. 2. Introduction of intensive road safety advertising (1989). 3. Introduction of automated traffic law enforcement (for example speed and red light cameras) (1990). 4. Graduated licensing systems	General improvements to vehicle handling and control (improved braking systems, speed control devices, electronic stability control etc).	1. Introduction of 50 km/h speed limits in urban residential areas (1998-2004). 2. Road infrastructure treatments including blackspot programs (for example road duplication, shoulder sealing, edge line marking, delineation etc)	1. The National Ten point Plan (implemented 1990 onwards.) 2. The series of National Road Safety Strategies (1992 onwards). 3. Australian Rural Road Safety Action Plan implemented (1996). 4. A series of State and Territory Road Safety Strategies, especially from the 1980s onwards
Crash	1. Wearing of seat belts compulsory throughout Australia (1973). 2. Compulsory wearing of bicycle helmets throughout Australia (1992).	1. Series of Australian Design Rules, providing better occupant protection (1969 onwards). 2. Motor Vehicles Standards Act (1989). 3. Consumer information programs encouraging improved secondary vehicle safety (for example NCAP)	1. First of the national black spot programs launched and state programs enhanced (1990).	
Post-crash	Prompter provision of emergency medical services			

tion with … pamphlets and posters to modifying the environments in which injuries occur. … By developing new laws and enforcement mechanisms and through new technologies…, (road safety practitioners) sought to protect people from coming into contact with injurious amounts of energy"[5]. While the view of the road safety problem expanded to recognise particularly the role of vehicle and road factors, human behaviour and personal responsibility remained a critical consideration. The latter were able to achieve significant short term gains, in contrast to vehicle and environmental changes which take many years to accumulate.

3. RESPONDING TO THE SLOW DOWN IN SAFETY IMPROVEMENTS IN THE LAST TEN YEARS

The countermeasures listed in Table 2, as well as many others not listed, have been invaluable in reducing Australia's road toll and more recently, in holding fatality levels against rising population numbers and vehicle travel. However recent trends in the crash data have made it apparent that further reductions will require a new road safety approach.

At its meeting in November 2003, the Austroads Council (the federation of all Australian transport jurisdictions) accepted that the greatest road safety gains would be achieved through adopting a Safe System approach[6], which has close similarities to the strategies that have been implemented in Sweden and the Netherlands:

- it is accepted that crashes will continue to occur, prevention efforts notwithstanding, given that humans make honest mistakes in judgement when using any system;
- the challenge for the proposed Safe System in the event of a crash is to ensure that no fatalities will occur (and that serious injuries will be reduced) for people behaving appropriately and lawfully within the constraints of the system;
- the key task of the Safe System is to manage vehicles, the road infrastructure and speeds in order to minimise the probability of death as a consequence of a road crash;
- as with Sweden's Vision Zero and the Netherlands' Sustainable Safety, the Safe System approach does not dismiss individual road user responsibilities and behavioural countermeasures but explicitly points to these aspects as supporting components of the system to ensure users are operating within the defined system tolerances.

An overview of Austroads' Safe System approach is given in Figure 2[6].

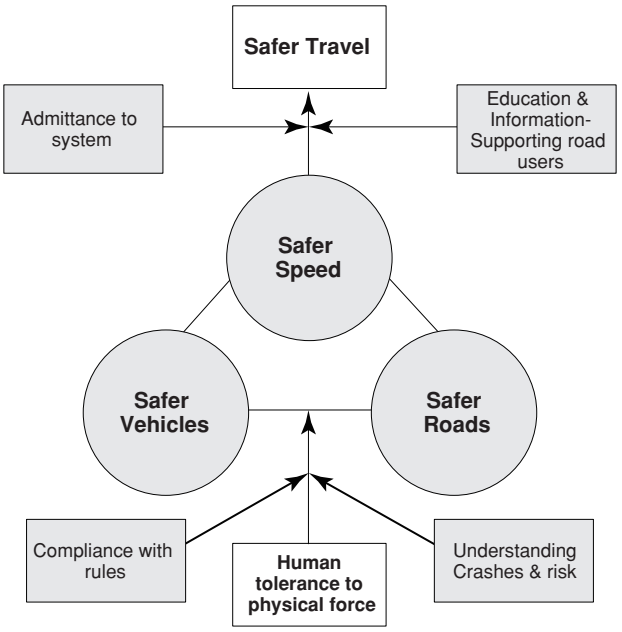

Fig. 2 Australia's Safe System

It is proposed that the Safe System framework will be used to support three key road safety streams[6]:

- safer roads and especially improved road risk assessment, treatment and standards – that is: improved risk analysis of the road network and its crash-related safety performance; identification of the most effective treatments including those offered by Intelligent Transport Systems; and a review of current safety standards (including those relating to speed limits, clear zones and roadside hazard control) to develop appropriate safety benchmarks for both new works and remedial treatments;
- safer speeds – whereby speed reductions are seen as a complementary measure to road-based improvements, especially in treating high-risk sections of the road network where there are no immediate engineering options;

- safer vehicles – to be achieved especially through improved marketing of vehicles with high safety ratings, largely through a two-pronged approach involving the promotion of vehicle crashworthiness ratings to the general public and the development of safer fleet vehicle purchase policies.

Safer road users have been described as the foundation of the Safe System strategy. Components in this context include compliance with road rules, admittance to the system (especially graduated licensing schemes for young drivers, strengthened sanctions to control unlicensed driving and improved assessment of fitness to drive in the face of medical conditions and functional declines) and information and education to support driving and travelling.

The Safe System approach strongly underpins Australia's current National Road Safety Strategy and the accompanying series of two-year Action Plans, which collectively aim to reduce Australia's road deaths from 9.3 per 100,000 population to no more than 5.6 in 2010[7].

4. SUMMARY

The dramatic inroads made into the national road toll during the 1980s and early 1990s in terms of the total number of people killed and seriously injured have largely ceased, with fatality levels especially during the last five years having stagnated. This levelling in safety performance seems common to many OECD countries, as Australia's per population road death rate changes over the last ten or so years have almost exactly mirrored the median changes for all OECD countries. Given this trend, Australia's transport jurisdictions have agreed to adopt a Safe System strategy as the most suitable means to regain the levels of improvement made in earlier decades.

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